DOCUMENT RESUME

ED 411 984 PS 025 835

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TITLE Young Children's Developing Understanding of Conceptual Perspective Taking.
PUB DATE 1997-04-00
NOTE 17p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (62nd, Washington, DC, April 3-6, 1997).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Age Differences; *Cognitive Development; Comparative Analysis; Foreign Countries; Models; *Perspective Taking; Predictor Variables; *Preschool Children; Preschool Education; Social Cognition
IDENTIFIERS Theory of Mind

ABSTRACT

In an attempt to validate the findings of other researchers regarding the development of conceptual perspective taking, this study used Taylor's (1988) 2-tiered model to examine development of perspective taking among 40 3- to 5-year-olds. Participating were 22 males and 18 females from English-speaking backgrounds attending a preschool in Australia. Three theory-of-mind tasks were used, in which a hand puppet questioned children to determine the developmental sequence of Level 1 and Level 2 abilities. Level 1 (Basic) questions assessed whether children understood that perception could be a source of knowledge; Level 1 (Advanced) questions assessed whether they understood that a puppet character could have different interpretations of a situation based on the knowledge he received. Level 2 questions assessed whether children could demonstrate an understanding that the mind can misrepresent reality. Findings indicated that age was an important predictor of conceptual perspective-taking ability, whereas verbal ability was not found to be an important predictor. Thus, 3-year-olds tended to have a "copy" theory of mind in which they believed that seeing is equivalent to knowing, whereas 5-year-olds were more likely to understand the interpretative nature of mental states. A linear, hierarchical model of development was identified for conceptual perspective taking, in which a basic Level 1 ability developed before an advanced Level 1 ability, which in turn developed before a Level 2 ability. Findings have implications for the theory-formation hypothesis. (Contains 20 references.) (Author/KB)

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ED 411 984

Young Children's Developing Understanding of Conceptual Perspective Taking

Diane Louise Szarkowicz

Abstract

This study investigated the development of conceptual perspective taking in forty 3- to 5-year-olds. Three different tasks were used to investigate the developmental sequence of Level 1 and Level 2 abilities. Age was found to be an important predictor of conceptual perspective-taking ability. In addition, a linear, hierarchical model of development was identified for conceptual perspective taking where a basic Level 1 ability developed before an advanced Level 1 ability, which in turn developed before a Level 2 ability. These findings are discussed in relation to the theory-formation hypothesis.

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Young Children's Developing Understanding of Conceptual Perspective Taking

Contemporary research has indicated that children generally develop an understanding about mental states in themselves and others during the period from three to five years of age (e.g., Astington, Harris & Olson, 1988; Lewis & Mitchell, 1994; Wellman, 1990). Such understanding, referred to as a theory of mind, is characterised by an ability to differentiate between a mental representation and a physical reality.

The difference in performance between 3- and 5-year-olds has been attributed to the inability of 3-year-olds to "use information about a person's past perceptual experience to assess another person's knowledge" (Pillow, 1989, p. 117). Furthermore, it has been suggested that younger children may overestimate perceptual experience as a knowledge source. For example, 3- and 4-year-olds were found to falsely attribute their own knowledge of a drawing to others who had only received an obscured, unidentifiable view (Taylor, 1988; Taylor, Cartwright & Bowden, 1991).

The inferences one makes "regarding those less tangible aspects of another's internal experience" are referred to as conceptual perspective taking (Marvin, Greenberg & Mossler, 1976, p. 511). Recent investigations concerning children's theories of mind have used conceptual perspective-taking tasks as a means for demonstrating representational understanding (Taylor, 1988; Taylor et al., 1991).

Based on Flavell's (1986) stages of perceptual perspective taking, a two tiered developmental process for conceptual perspective taking has been hypothesised by Taylor (1988). This process is different from that of Flavell (1986) as it incorporates the role of internal processes such as beliefs, thoughts, and desires in perspective taking rather than focusing only on physical perception. At Level 1 children "have difficulty separating their own knowledge or interpretation of what they see" from the available perceptual information (Taylor, 1988, p. 704). At this level children are said to have a copy theory of mind where they believe that seeing is equivalent to knowing, and are unaware that each individual interprets experiences differently (Taylor, 1988; Taylor et al., 1991; Wellman, 1990).

The ability to consider different information sources and interpretations of knowledge is imperative to success on Level 2 conceptual perspective-taking tasks. At Level 2 children are believed to have acquired a representational theory of mind (Dockett, 1994), and can cognise that seeing is not equivalent to knowing (Taylor 1988). Therefore, a copy theory of mind can be equated with Level 1 conceptual perspective taking, while Level 2 ability is equated with a representational theory of mind.

The seeing-knowing distinction has been investigated by Taylor (1988) through the use of restricted view pictures. A picture of an animal was shared with a child who was told some personal information about the animal depicted. The picture was then covered so the view was restricted and identification was inhibited. This restricted view was then shared with a puppet who, unlike the child, had not been exposed to the identity of the picture or the associated personal information. Children were then asked questions as to whether the puppet could identify the picture based on the limited view and as to whether the puppet knew the personal information. Younger children tended to attribute their own knowledge to the puppet, and generally did not appreciate the view that a shared perspective could be interpreted differently until about six years of age (Taylor, 1988).

Numerous studies have investigated the ability to distinguish seeing and knowing through a hidden object task (e.g., Pillow, 1989; Ruffman & Olson, 1989; Wimmer, Hogrefe & Perner, 1988). In the case of Ruffman and Olson (1989) an object was placed in a box and a doll was either allowed to look at the contents or denied perceptual access. The child then responded to perceptual questions such as "Did the doll look in the box?" followed by Level 2 knowledge questions like "Does the doll know what is in the box?" Results indicated that 3-year-olds did not perform as well as 6-year-olds when assessing knowledge in another. In addition, using a similar Level 2 task, Pillow (1989) reported that young children's most common difficulty was over attributing knowledge to another. These Level 2 tasks required children to not only assess the perceptual information in another, but also the

connection this information formed with knowledge. Hence, Level 2 tasks require children to discriminate with greater precision than Level 1 tasks and understand how "psychological factors" such as access to knowledge determine interpretations of reality (Pillow, 1989, p. 127).

The present study was designed to examine the development of conceptual perspective taking by adapting a number of tasks used in previous investigations such as those of Taylor (1988), Pillow (1989), and Ruffman and Olson (1989). The significance of this problem, at a theoretical level, lies in its attempts to validate and verify the findings of other researchers in relation to the developmental nature of conceptual perspective taking. More specifically, this research attempted to identify a sequence between Level 1 and Level 2 abilities where progress was largely determined by age. The hypothesis that young children attribute their knowledge (or ignorance) to another (Marvin et al., 1976; Mossler, Marvin & Greenberg, 1976) predicts poor performance by 3-year-olds on Level 2 conceptual perspective-taking tasks, indicating a possible developmental lag between Level 1 and Level 2 abilities.

METHODOLOGY

Sample

The sample consisted of 22 males and 18 females (N=40) between the ages of 41 and 65 months. All children were from an English speaking background and had been attending the same preschool in regional Australia for at least six months at the time of data collection. All subjects were questioned on an individual basis within a reading corner of the regular classroom. Each child sat next to the researcher at a table which faced a wall of the classroom to minimise distraction.

Materials

A hippopotamus hand puppet referred to as Harry was used for all questioning. A puppet was decided appropriate for this research as the use of a doll or puppet in theory of mind experiments, rather than another individual, has not been found to confound results (Sodian & Wimmer, 1987). A number of foods were also used for each question, providing a familiarity for each child, and included an apple, banana and

a colour picture of a chocolate cake. The picture (17 x 11 cm) included a cardboard cover which aimed to restrict the vision of the chocolate cake to a small square (2 x 2 cm) cut out of the middle. This cover could be folded back to reveal the picture or placed over to prevent identification. When the cover was in place only a small portion of the chocolate icing was visible but was not identifiable as icing. A box with a lid (33 x 14 x 11 cm) was used for the basic Level 1 questions, and a colour photograph (8 x 6 cm) depicting the researcher eating an apple was utilised for the Level 2 questions.

Procedure

Prior to testing, each subject became familiar with the materials for the experiment. The experimental materials were initially hidden under the table before being placed individually in front of the child to identify. Children were then told they would be playing a surprise game with a friend of the researcher, and were introduced to Harry the hippopotamus. As the classes had recently shared a text about a hippopotamus, children were very familiar with this animal.

An interview formed the basis of this research and aimed to investigate conceptual perspective-taking abilities in the given age group. The questions used in the interview were adaptations of tasks utilised in previous studies by Taylor (1988), Pillow (1989), and Ruffman and Olson (1989). The interview was structured into three sets of questions which reflected the Level 1, Level 2 conceptual perspective taking developmental pattern suggested by Taylor (1988). The first two sets of questions investigated conceptual perspective taking at a basic and an advanced Level 1 understanding, while the final set of questions investigated Level 2 abilities.

Level 1 Questioning: Basic

The initial set of Level 1 questions aimed to assess whether subjects understood that perception could be a source of knowledge (Pillow, 1989). An apple was initially placed in the box for the subject and Harry to see. It was verbally emphasised that Harry could see in the box. Children were then questioned about this to ensure they received this information. Two simple perceptual questions were then

posed concerning Harry's knowledge of the contents: "Can Harry tell me what food is in the box? What food would Harry tell me is in the box?" This condition was then reversed so Harry could not see what was in the box. The child, on the instruction of the researcher, hid Harry behind the bookshelf while a banana was placed in the box and the lid placed in position. The child retrieved Harry and it was verbally emphasised that he could not see what was in the box. Children were then asked if Harry knew what was in the box to determine whether subjects attributed their knowledge to Harry or recognised his ignorance in the situation.

Level 1 Questioning: Advanced

Harry was once again hidden by the child, on the instruction of the researcher that he be placed where he could not see or hear what was happening at the table. Children were then shown the chocolate cake picture and told, "Harry is going to get a surprise because he will not be able to see the picture properly." The picture was then hidden by the cardboard cover so only a 2 x 2 cm square of the picture was visible. This view did not allow the picture to be identified as a chocolate cake as only a part of the brown icing was visible . The limited detail provided by this view was emphasised for each subject when Harry was returned to the table. The following questions were asked of each child: "Can Harry tell me what the picture is? Why? What would Harry tell me the picture is?"

This advanced Level 1 questioning was based on research by Taylor (1988, Experiment 1) who used a similar task to investigate both Level 1 and Level 2 conceptual perspective taking. However, in the current research the task was used to investigate the transitional state between Level 1 and Level 2 understanding. Therefore, success on this task was perceived as developing after a Level 1 competence but before Level 2 abilities. While the current task was similar to that of Taylor (1988) there were a number of differences in this study. Firstly, Taylor used pictures of animals in her investigation and provided children with three items of information; the identity of the animal, what action the animal was engaged in, and personal information such as the animal's name. In the current research, children only

received information as to the identity of the picture, (e.g., This is a picture of a chocolate cake). Secondly, Taylor (1988) asked children if the puppet knew there was a particular animal in the picture (e.g., "Does [puppet's name] know there is an [elephant] in the picture?") and repeated the procedure a number of times using different views of each picture (Taylor, 1988, p. 707). In contrast, in the current study children were only asked one set of questions about one restricted view, with the questions being whether Harry would be able to tell the researcher the identity of the picture and what Harry would say the picture was. The current task only included one set of identity questions as the aim was to investigate whether children understood that Harry could have different interpretations of a situation based on the knowledge he received, rather than if they understood that representations could conflict with reality.

Level 2 Questioning

At the request of the researcher, Harry was once again hidden by the child in a location where he was unable to see or hear what was happening at the table. The following short story was narrated to each child: "I am going to tell you something that Harry does not know. I was eating a vegemite sandwich just before you came to visit. Harry does not know I was eating a vegemite sandwich." Harry was then returned to the table and shown the photograph of the researcher eating the apple. It was verbally emphasised that Harry was looking at the photograph. Each child was then asked: "What does Harry think I've been eating?" To ensure the initial knowledge was remembered and the task understood, subjects were finally asked whether they knew what the researcher had been really eating.

This final task involved children making a clear distinction between what they knew and what Harry knew. Most importantly, children needed to understand that Harry was ignorant of the information which was shared by the researcher, and that his beliefs regarding the food eaten by the researcher were different, based on his interpretation of the situation. Hence, this task differed from the advanced Level 1 task as it required children to demonstrate an understanding that the mind can misrepresent reality, whereas the preceding task only required children to acknowledge

that Harry's interpretation could be different from their own, and not that it necessarily was a conflicting representation. Because the representations of a true belief are a replication of reality, it is only when an individual must predict behaviour in another who has a belief which is different from reality that a representational understanding of mental states can be demonstrated clearly (Moore, Jarrold, Russell, Lumb, Sapp & MacCallum, 1995).

To avoid unnecessary anxiety, children who were unsuccessful on three consecutive questions did not proceed further in the interview. The remaining questions which were not attempted by such subjects were coded as non-responses. After all interviews were completed, the preschool teacher allocated an informal verbal ability rating to each child. This rating was based on her observations of each subject over the six month period prior to data collection. Children were rated comparative to each other, with a rating of 3 representing above average ability, 2 equalling average ability and a rating of 1 being equivalent to below average verbal ability.

Nature of the Variables

Each child's interview responses were coded dichotomously so that 1 was allocated for a correct response and a 0 for an incorrect or non-response. These coded responses were then grouped into three sets, basic Level 1, advanced Level 1 and Level 2, to reflect each of the levels of questioning used in the interview. Using these sets, a number of variables were then selected for analysis. Firstly, there were a number of independent variables, being Total A which represented basic Level 1 conceptual perspective-taking ability, age as measured in months, and verbal ability. Total B which was the measure of advanced Level 1 conceptual perspective taking, was used initially as an independent variable and later as a dependent variable in the path analysis for Model 2. There were also two other dependent variables used in the analyses, one being the measure of performance on only the Level 2 questions (Total C), and the other being the total measure of conceptual perspective taking (Total D) which reflected the number of correct responses made on the entire interview.

Results

The analysis of the interview data was conducted in two stages. Firstly the relationships between the selected independent variables of age, verbal ability, and each measure of conceptual perspective taking were analysed using multiple regression analysis (SPSS, 1988). Age was found to be an important variable in predicting conceptual perspective-taking performance as indicated in Table 1. Even after the effect of verbal ability was removed, age still appeared to strongly influence the total measure of conceptual perspective taking accounting for more than 17% of the variance. Verbal ability was entered into the model first as a means of determining whether it was an important predictor of conceptual perspective taking when entered second. Verbal ability was not found to be an important predictor as indicated in Table 1.

TABLE 1

SUMMARY OF MULTIPLE REGRESSION ANALYSIS FOR AGE AND VERBAL ABILITY ON TOTAL CONCEPTUAL PERSPECTIVE-TAKING MEASURES

Variable	Multiple R	R^2 change	F	*p*	Beta	T	*p*
Verbal	.270	.073	2.989	.092	.243	1.624	.113
Age	.418	.175	3.921	.029	.320	2.138	.039

The second stage of analysis involved a path analysis which aimed to investigate the relationships between Level 1 and Level 2 conceptual perspective taking. Multiple regression analyses were undertaken to test two different models of this relationship (see Figure 1). In the analysis for Model 1 the measure for Level 2 conceptual perspective taking (Total C) was the dependent variable with the scores for basic Level 1 (Total A) and advanced Level 1 (Total B) being entered simultaneously as independent variables. The results from this analysis are presented below in Table 2.

TABLE 2

SUMMARY OF MULTIPLE REGRESSION ANALYSIS FOR MODEL 1

Variable	Multiple R	R^2 change	F	*p*	Beta	T	*p*
Total A					.136	1.286	.207
Total B	.818	.669	37.356	.000	.748	7.080	.000

The analysis for Model 2 involved two regression equations where initially the measure for Level 2 ability (Total C) was the dependent variable and the advanced Level 1 measure (Total B) was the independent variable. The second stage of this analysis then used Total B as the dependent variable and the measures for basic Level 1 conceptual perspective taking (Total A) as the independent variable. The results from this analysis are presented in Table 3.

TABLE 3

SUMMARY OF MULTIPLE REGRESSION ANALYSES FOR MODEL 2

Variable	Multiple R	R^2 change	F	*p*	Beta	T	*p*
[a]Total A	.446	.199	9.409	.004	.446	3.067	.004
[b]Total B	.809	.654	71.826	.000	.809	8.475	.000

Note. [a]Independent variable with Total B as the dependent variable
[b]Independent variable with Total C as the dependent variable

Model 1 suggests that both basic and advanced Level 1 abilities can develop simultaneously. While this model accounts for 66% of the variance in the Level 2 ability scores, the beta coefficient between basic Level 1 and Level 2 is only 0.13 and is not significant. As the beta weights allow estimation of paths in a model, this low coefficient shows that basic Level 1 ability is not a good predictor of Level 2 ability.

Model 2 is a linear, hierarchical reflection of conceptual perspective taking development which accounts for 65% of the variance in Level 2. While this total explained variance is marginally smaller than that of Model 1, the beta coefficient between basic Level 1 and advanced Level 1 is 0.44, and is 0.81 between advanced

Level 1 and Level 2. These higher beta coefficients for each of the variables are both significant and constitute a stronger representation of the relationships between the levels than occurred in Model 1. This second model supports the hierarchical developmental process suggested by Taylor (1988), who proposed that conceptual perspective taking developed through a two tiered process, where Level 1 abilities proceeded Level 2 abilities.

Discussion

The finding that age was an important predictor for conceptual perspective-taking ability supports research which indicates that the theory of mind of a 3-year-old is not as sophisticated as that of a 5-year-old (e.g., Taylor, 1988; Wellman, 1990). In explaining this difference, Wellman (1990) suggests that 3-year-olds fail to acknowledge the unique "interpretative aspects of the mind and hence the constructive relation between all minds and reality" (p. 317). However, this ability to understand the interpretative nature of mental states is more apparent in 5-year-olds. Thus, 3-year-olds but not 5-year-olds appear to have a copy theory of mind where they hold the belief that seeing is equivalent to knowing (Taylor, 1988; Wellman, 1990).

Based on the evidence in the current investigation it would appear that younger children experience difficulties on questions which require them to acknowledge the subjective nature of mental states, with such children tending to attribute their own knowledge to another. This finding is consistent with that of Pillow (1989) who suggested that young children overattribute knowledge when perceptual information is limited. Specifically in relation to Level 2 tasks, Pillow (1989) indicates that when interpreting ambiguous information, children need to understand that such interpretations "may depend upon prior knowledge or expectations acquired through past experiences" (p. 127). Hence, younger children may have had difficulty with the Level 2 task used in this research as it required them to understand the role of prior knowledge (and absence of such) in Harry's interpretation of the context. It is possible that some children may have been confused between what information Harry had received and that which he did not, particularly as one portion of information was only

presented verbally while the other was presented visually and accompanied by informal verbal comments which emphasised the puppet's actions.

Even though this research clearly indicates that age is a stronger predictor of conceptual perspective taking than verbal ability, the effect of verbal ability may have been somewhat underestimated because of the way in which the ratings seem to have been constrained to particular age groups. Thus, it appears that the verbal ability ratings given by the preschool teachers were allocated albeit unintentionally within age groups rather than across the entire sample. It is possible that if verbal ability had been rated between all groups the results would have been different. Indeed, Jenkins and Astington (1996) found that children needed a specific level of linguistic competence before they could demonstrate an understanding of false belief. In their study of 3- to 5-year-olds, general language ability and verbal memory were found to be good predictors of false belief performance after controlling for age. However, the present finding that verbal ability was not a significant predictor is consistent with that of Taylor (1988). Given the inconsistency between studies in relation to verbal ability and theory of mind, further investigations would be justified.

While it seems apparent that language is an important medium for using a theory of mind, in relation to the current study of conceptual perspective taking, there is a difference between thinking and verbal ability. Thus, while language is important for demonstrating an understanding of mental states, it "bears no relationship to underlying competence" (Jenkins & Astington, 1996, p. 70). This has major implications for developmental research where there is a tendency to utilise experimental tasks which rely primarily on language to facilitate understanding. It is possible that children's understanding on some tasks can be underestimated due to a number of variables which confound their performance. For instance, the language and nature of an experimental context can be unfamiliar to a child who may not have experienced such a situation and therefore, may be uncertain as to what behaviour is appropriate (Siegal & Beattie, 1991). Nevertheless, while the current study supports previous findings which indicate that the theory of mind capabilities of 3-year-olds are

not as sophisticated as those of 5-year-olds, other studies which have utilised naturalistic contexts and focused on children's spontaneous comments have found greater understanding in younger children (e.g., Brown & Dunn, 1991; Shatz, Wellman & Silber, 1983). Hence, with such discrepancies there is still a need for further investigation concerning understandings of mind within contexts and relationships that are important to children.

Of the two models constructed from the present data, the preferred linear model is consistent with the theory-formation perspective which suggests that children slowly develop and refine their ideas through experience and maturation. The theory-formation approach process is believed to be fundamental to the development of knowledge in children and suggests that "fairly general structural changes and reorganisations in the child's view of the mind" should occur (Astington & Gopnik, 1991, p. 17). Thus, such a view is consistent with the hierarchical development of conceptual perspective taking evidenced in this research. For example, a child with a basic Level 1 ability might slowly modify her cognitions due to the internal and external forces she encounters in everyday activities, so as to develop an advanced Level 1 understanding. With further experience which challenges her cognitions, the same child would continue to modify her advanced Level 1 understanding until she develops a Level 2 ability where the internal and external forces harmonise due to her appreciation of the interpretative nature of mental states.

In summary, this investigation identified a number of findings in relation to conceptual perspective taking. Firstly, age was found to be an important predictor of conceptual perspective-taking ability with 5-year-olds demonstrating a more sophisticated understanding than 3-year-olds. Age was found to be significant even after the influence of verbal ability was controlled. Secondly, a hierarchical development for conceptual perspective taking was identified where a basic Level 1 understanding developed before an advanced Level 1 understanding, and an advanced Level 1 understanding developed prior to a Level 2 understanding. While these findings are consistent with previous experimental research (Taylor, 1988; Pillow,

1989), further investigations are necessary, particularly those which consider social contexts that are significant to children.

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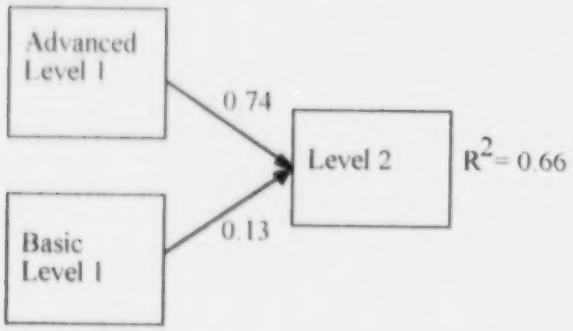
FIGURE 1

PATH ANALYSIS OF THE TWO PROPOSED MODELS OF CONCEPTUAL PERSPECTIVE TAKING DEVELOPMENT

Model 1



Model 2